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TECHNICAL ABSTRACTS

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LEAD DEVELOPMENT ASSOCIATION

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LEAD ABSTRACTS

A Selection of Abstracts of Literature and Patents on the Utilisation of Lead and its Alloys

NO. 3 APRIL 1959

Technical Papers 120-150
Patents 151-172

ISSUED BY THE

LEAD DEVELOPMENT ASSOCIATION

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ALLOYS

120 DIRECT STUDY OF EUTECTIC ALLOYS BY MEANS OF ELECTRON MICROSCOPY — *N. Takahashi and K. Ashinuma*

J. Inst. Metals, Sept., 1958, 87(1), 19-23, B.N.F. Serial 44,736.

The lead-tin eutectic alloy is investigated.

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121 FORMATION OF Ni-Ge PHASE IN MOLTEN LEAD — *M. E. Steidlitz*

Trans. AIME Met. Soc., Oct., 1958, 212(5), 676-678.

Germanium is bonded to nickel with lead; a new metallic phase which appears at the bond is examined.

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122 THE SOLID SOLUTIONS OF GALLIUM IN LEAD — *J. N. Greenwood*

J. Inst. Metals, Nov., 1958, 87(3), 91-93.

There is a slight solid solubility of gallium in lead (0.02% at 110°C and 0.17% at the eutectic temperature 317°C). The quenched alloys from this solid solution range, exhibit ageing characteristics.

ANALYSIS

123 DETERMINATION OF COPPER, LEAD, TIN AND ANTIMONY BY CONTROLLED-POTENTIAL ELECTOLYSIS

(1) GENERAL METHOD OF ANALYSIS

(2) APPLICATION OF THE METHOD TO THE DETERMINATION OF Cu, Pb, Sn and Sb IN BRONZES AND BRASSES — *B. Alfonsi*

Analyt. Chim. Acta, Sept., Oct., 1958, 19(3, 4), 276-283, 389-394.
(Sept.) Successive determination of copper, lead, tin and antimony from the same solution, by controlled-potential electrolysis method; maximum working conditions and behaviour of the metal during deposition are discussed. (Oct.) Survey of electrolytic methods of determining the above elements in copper base alloys.

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124 RAPID DETERMINATION OF TIN, COPPER, LEAD, IRON AND NICKEL IN GUN-METAL AND BRONZES — *H. Wiedmann*

Metall, Nov., 1958, 12(11), 1005-1007.

(In German). Description of volumetric methods; includes determination of lead. Mainly concerned with control of foundry melts.

BATTERIES

125 SELF-DISCHARGE OF LEAD-ACID BATTERIES *G. Gabrielson*

Journal of Applied Chemistry, Vol. 8, Nov. 8, 1958, 748 pp.

Diminishing self-discharge of lead-acid batteries by depositing a thin layer of lead on positive grids. The effect is only temporary. Anodizing is also considered but rejected. The role of antimony in the self-discharge process is discussed.

BEARINGS

126 BABBITTING OF CAST IRON : DEVELOPMENT OF IMPROVED PREPARATORY METHODS *Phosphor Bronze Co. Ltd.*

Foundry Trade J., Sept. 4, 1958, 105, 295-296; Met. Ind., Aug. 29, 1958, 93(9), 175-176.

Treatment of bearing shells by Kolene process prior to white metalling.

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127 SWEDES MAKE MODERN BEARINGS *A. E. Olsson*

Met. Progress, Aug., 1958, 74(2), 91-93.

Bearing shells are electrolytically cleaned in bath of Kolene 4; fluxed with zinc ammonium-chloride and hydrochloric acid; tinned with 60 : 40 tin-lead alloy, and babbitt coated in a centrifugal casting machine.

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128 PRODUCTION OF THIN-WALLED (STEEL-BACKED) BEARING SHELLS BY THE PRESSURE CASTING METHOD (LUHMANN-MARTIN PROCESS) *H. Backof*

Giessereitechnik, Aug., 1958, 4(8), 188-191.

(In German.) Special machines for casting bearings used on East German Railways are described.

CABLES

129 CABLE PRODUCTION *Aberdare Cables Ltd.*

Met. Ind., Nov. 21, 1958, 93(21), 437-438.

Brief description on the company's operations, including lead alloy sheathing.

COATINGS

130 THE INFLUENCE OF LEAD ON ENGINE OILS AND ITS ADVANTAGES OVER TIN AS A PROTECTIVE COATING FOR PISTONS — *H. Kessler and H. König*

Eng. Digest, July, 1958, 19(7), 309-310. Condensed translation from M.T.Z., May, 1958, 19(5), 186-189.

Although lead coatings on pistons may cause decomposition of lubricating oils in diesel and petrol engines, this decomposition is usually insignificant compared with that caused by the lead content of the fuels. Lead is considered better than tin for piston coatings because of its higher melting point.

CORROSION

131 CORROSION OF METALS CONNECTED TO GRAPHITE COMPONENTS — *T. K. Ross*

British Chem. Eng., July, 1958, 3(7), 368-370.

Couples between graphite and mild steel, copper, lead, stainless steel and titanium, respectively, are used in polarisation tests in acid, neutral and alkaline solutions; also describes long-term corrosion tests.

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132 LEAD—AS A MATERIAL OF CONSTRUCTION FOR CHEMICAL PLANT — *J. G. Openshaw*

Corrosion Technology, Vol. 5, No. 12, page 381, Dec. 1958.

Describes special techniques developed specifically for the chemical industry.

ELECTROLYSIS

133 A PRACTICAL APPARATUS FOR THE CONTROL OF LEAD-TIN ALLOY (FLUOBORATE) PLATING BATHS — *R. L. Garrett*

Plating, Nov., 1958, 45(11), 1139-1141.

Used for plating 93% lead 7% tin alloy coatings on aircraft engine parts. Can be used to give a quick check of bath composition, and is normally employed in conjunction with routine wet analysis of constituents.

LEAD—GENERAL

134 THE INTERNATIONAL CRISIS IN NON-FERROUS METALS MINING AND THE PROSPECTS OF OVERCOMING IT — *F. Friedensberg*

Erzmetall, Nov., 1958, 11(11), 515-519.

(In German). Reviews price falls, particularly in lead and zinc, and their causes. Suggests that improvement in the position can only result from increasing world demand.

135 A TEN-YEAR STUDY OF LEAD SHOWS NEED FOR PRODUCTION CONTROL — *K. W. Green*

Eng. and Min. Journal, Vol. 159, No. 12, page 71, Dec. 1958.

Statistical study of the lead industry, covering a 10 year period, 1947-1957.

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136 LEAD AND ITS ALLOYS

Indus. and Eng. Chemistry, Vol. 50, No. 9, Sept. 1958, pp. 1449.

A review of recent literature on uses of lead. (89 references).

METALLURGY

137 NOTE ON THE LEAD-INDIUM EQUILIBRIUM DIAGRAM — *S. Valentiner*

Z. Metallkunde, July, 1958, 49(7), 375.

A recently determined liquidus curve is now added to a sketchy version of the rest of the diagram obtained from existing literature.

MINING

138 SPECTOGRAPHIC ANALYSIS OF THE LEACHING SOLUTIONS OF LEAD AND ZINC ORES — *M. Civera*

Metallurgia Italliana, No. 8, 329, Aug. 1958.

(In Italian.) Approximate determination of lead, iron and zinc in ores, by a rapid method described.

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139 SYMPOSIUM ON THE FUTURE OF NON-FERROUS MINING IN GREAT BRITAIN AND IRELAND, LONDON, SEPTEMBER, 1958 — *Institution of Mining and Metallurgy*

Included in the papers are several on lead mining in the British Isles.

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140 PROGRESS IN MINERAL DRESSING: TRANSACTIONS OF THE INTERNATIONAL MINERAL DRESSING CONGRESS, STOCKHOLM, 1957 — *Svenska Gruvforeningen and Jernkontoret*

Book, 1958, 754 pp., Almqvist and Wiksell, Stockholm. 95 Swedish Krone.

Discusses, among other things, flotation of sulphide ores, including copper-lead-zinc, and lead-zinc.

OXIDES

141 TEXTURES OF ELECTRODEPOSITED LEAD DIOXIDE *Y. Shibasaki*

Journal of the Electrochem. Soc., Vol. 105, No. 11, Nov. 1958, pp. 624.

Textures, relative strengths and conditions of deposition of lead dioxide are discussed. Bright, smooth deposits were found to be strongest.

PAINTS

142 LEAD BASED PAINTS IN CORROSION CONTROL *N. J. Read*

Corrosion Prevention and Control, Sept. 1958, 5(9), 61-64, 66-67.

Description of the protection of iron and steel by red lead and calcium plumbate priming paints, and some remarks on the painting of galvanised iron and aluminium.

PHYSICS

143 CRATER FORMATION IN METALLIC TARGETS *W. S. Partridge, H. B. Vanfleet and C. R. Whited*

J. Applied Physics, Sept. 1958, 29(9), 1332-1336.

Formation of craters by spherical pellets fired into semi-infinite targets of same material. Metals considered include lead, tin, zinc and lead-tin alloys; measurement of craters.

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144 THEORY OF THE SURFACE TENSION OF LIQUID METALS *P. S. Zyryanov*

Fizika Metallov i Metallovedenie, 1957, 5(3), 545-547.

(In Russian.) Derivation of a formula relating surface tension to temperature. Experimental data for lead, tin and other metals used to check formula.

REFINING

145 PRODUCTION OF HIGH PURITY LEAD *Ya. Z. Malkin and V. Ya. Sergienko*

Tsvetnye Metally, Aug. 1957, 30(8), 44-51.

(In Russian.) Double electrolysis followed by a series of fire-refining treatments; enables copper and silver contents to be reduced to .00003-.0001% and .000002-.00002% respectively.

146 **(1) PRACTICE IN THE EXTRACTION OF SILVER FROM ZINC SKIMMINGS IN THE KURILO LEAD FACTORY (BULGARIA)** — (1) *P. I. Mechenov and K. S. Kyncher*

(2) ELECTROTHERMAL PROCESS FOR THE DISTILLATION OF ZINC FROM SILVER SKIMMINGS — (2) *I. I. Kershanskii and V. P. Ovcharenko*

Tsvetnye Metally, (1) Dec., 1957, 30(12), 30-35; (2) April, 1958, 31(4), 34-43.

(In Russian.) (1) Description of the separation of silver and zinc from the skimmings of the desilvering of lead. (2) Description of the equipment for recovery of silver by distillation on laboratory and semi-industrial scales.

SMELTING

147 **VACUUM-THERMAL PROCESS FOR THE VOLATILISATION OF LEAD AND LEAD ZINC COMPOUNDS FROM LEAD-COPPER MATTE** — *P. I. Mechenov*

Tsvetnye Metally, Jan., 1958, 31(1), 48-52.

(In Russian.) Effect of temperature, time and pressure on the recovery of lead and zinc by vacuum sublimation.

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148 **(1) THE WAY FOR ELECTROTHERMICS IN THE METALLURGY OF LEAD AND ZINC** — (1) V. N. *Kostin*

(2) INTRODUCTION OF ELECTROTHERMICS AT THE UST'KAMENOGORSK LEAD-ZINC COMBINE — (2) *D. O. Averchenkov, A. M. Vartanyan and D. S. Kopchenko*

(3) ELECTRIC SMELTING IN THE METALLURGY OF LEAD AND ZINC — (3) *P. V. Sergeev*

(1) Tsvetnye Metally, Jan., 1958, 31(1), 3-10; (2) ibid., May, 1958, 31(5), 35-38; (3) ibid., June, 1958, 31(6), 83-85.

(In Russian.) Description of the use of electrothermics in zinc and lead extraction.

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149 **ELECTROTHERMAL PROCESSES IN THE LEAD-ZINC INDUSTRY** — *M. M. Lakernik*

Tsvetnye Metally, Feb., 1958, 31(2), 20-27.

(In Russian.) Electric smelting of lead-zinc-copper concentrates.

150 UTILISATION OF SLAG FUMING PLANT ON THE UST'-KAMENOGORSK LEAD-ZINC COMBINE

P. A. Donchenko, A. B. Novozhilov and N. K. Salomantov

Tsetnye Metally, June, 1958, 31(6), 74-82.

(In Russian.) Description of the plant and operational data. Effect of time on lead and zinc contents of slag and fume.

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PATENTS

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ALLOYS

151 BRITISH PATENT 799,280. "ELECTRODEPOSITION OF Pb-In ALLOYS"

VANDERVELL PRODUCTS LTD.

Electrodeposition of Pb-In alloys from baths containing hydrazine and a controlling agent (ethylene—, propylene—, or cyclohexane 1, 2 diamino tetracetic acid).

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152 BRITISH PATENT 802,825. "LEAD ALLOYS FOR ACCUMULATOR BATTERIES"

ACCUMULATOREN-FABRIK A.G

Covers alloys containing 2—20% antimony, 0.075—1% arsenic and 0.04—0.12% copper.

ANALYSIS

153 GERMAN PATENT 1,050,085. "SAMPLING OF LIQUID METALS"

A TEVES MASCHINEN-U-ARMATURENFABRIK K.G.

The liquid metal is poured into a horizontal stream of water and the finely divided product caught in a collecting funnel, arranged with its axis in line with the flow.

BATTERIES

154 BRITISH PATENT 798,037. "PLATES FOR Pb-ACID BATTERIES"

YUASA BATTERY CO. LTD.

Glass fibre/synthetic resin tubes for holding active material.

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155 BRITISH PATENT 800,734. "ELECTRODES FOR ELECTRIC STORAGE BATTERIES"

J. B BRENNAN

Layer of porous metal on dielectric material (e.g. fibre glass or plastic cloth), sprayed with Pb, Ni, Fe, Zn or Cd.

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156 BRITISH PATENT 803,488. "PLATES FOR LEAD-ACID SECONDARY BATTERIES"

CROMPTON PARKINSON LTD.

Produced by extruding lead or lead alloy sheet (e.g. by extruding a tube, slitting longitudinally and opening out) rolling into foil, and punching holes.

157 GERMAN PATENT 1,049,948. "POSITIVE PLATES FOR LEAD ACCUMULATORS"

DEUTSCHE BUNDESBAHN

The active masses (i.e. pastes of lead compounds) are contained in small tubes of microporous plastic, or spun glass, stuck together by microporous plastic. These tubes are arranged at right angles to the plane of the plate: the grids are frameworks of diagonal, vertical or horizontal bars. A battery so constructed is claimed to be particularly suitable for starting diesel locomotives and railcars.

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158 BRITISH PATENT 798,037. "PLATES FOR Pb-ACID BATTERIES"

YUASA BATTERY CO., LTD.

The active material is held in tubes produced from glass fibre and a synthetic resin.

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159 GERMAN PATENT 1,049,949. "TUBULAR LEAD ACCUMULATOR PLATES"

G. HAGEN A.G.

The "grid" of this unit is in the form of a spiral of lead strip, formed by extrusion. This spiral is surrounded by the active mass and the resulting cylinder is wrapped in glass cloth and plastic tape (or covered with a rubber sleeve) to form a tube.

(See also Batteries—No. 158).

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160 BRITISH PATENT 809,884. "ELECTRICAL STORAGE BATTERIES"

BORIOLO, L.A.

A retainer for electrical storage batteries is formed from thermoplastic resinous material by introducing die-forming cylindrical bodies into the pockets of the retainer and subjecting the material to a thermal treatment, thereby causing it to shrink and harden about the cylindrical bodies. These bodies are then removed to leave a self-sustaining retainer possessing a number of parallel and elongated cylindrical pockets in the acid-resistant thermoplastic material.

CERAMICS

161 AUSTRALIAN PATENT 39057/58. "DIELECTRIC CERAMIC COMPOSITION"

COMP. GENERALE DE TELEGRAPHIE SANS FIL

Dielectric materials having a dielectric constant of the order of several thousands at temperatures above 120°C are produced from a mixture of alkaline-earth titanates, stannates or zirconates with lead salts thereof, and from 2—15% by weight of bismuth oxide.

COATINGS

162 BRITISH PATENT 803,316. "HOT DIP COATING"

HORIZONS INC.

Hot dip coating of titanium, zirconium, hafnium, thorium, vanadium, niobium and tantalium, with lead and other base metals using molten alkali metal chloride fluxes.

EQUIPMENT

163 BRITISH PATENT 809,935. "HEAT EXCHANGER"

NOBEL-BOZEL

Heat exchangers functioning as economisers are often subjected to burning gases containing both SO_2 and SO_3 which will condense in the presence of water vapour causing serious corrosion. A heat exchanger is described consisting of hollow tubes of ferrous metals coated with a homogeneus layer of nickel, which has mechanically compacted into it, a layer of pure lead. The nickel is electrolytically deposited and the lead is similarly deposited on to the nickel and in addition is subjected to compression and/or surface drawing.

REFINING

164 GERMAN PATENT 1,046,335. "THE REMOVAL OF TIN FROM LEAD"

METALLWERKE UNTERWESER A.G.

The removal of tin from molten lead can be accelerated by adding lead flue ash as an oxygen donator together with a little soda. In order to remove one part of tin, it is necessary to use 1/1.5 parts of lead flue ash and 0.1/0.15 parts of soda (with or without lime) and stir at approximately 500°C.

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165 GERMAN PATENT 1,046,334. "REFINING OF LEAD"

H. J. ENTHOVEN & SONS LTD.

Impurities, especially antimony, can be removed from lead by melting in the presence of caustic alkali and lead sulphide (galena).

SMELTING

166 GERMAN PATENT 1,046,337. "THE CONDENSATION OF ZINC VAPOUR"

METALLURGICAL PROCESSES LTD. & NATIONAL SMELTING CO.

In the device recently developed by these companies to condense zinc vapour by means of liquid lead slag, particles occasionally collect on the surface of the lead. This patent deals with the removal of this slag by an inclined conveyor which dips into a bath of molten metal and drags the floating scum over the wall of this container.

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167 GERMAN PATENT 1,046,325. "SEPARATION OF CADMIUM AND LEAD FROM ZINC SULPHIDE CONCENTRATES"

NEW JERSEY ZINC CO.

Particles of the ore are introduced into a fluidized bed divided into an upper and a lower zone. The rising current of air oxidises sulphur in the zinc sulphide to SO_2 and the rate of flow of gas is arranged so that there is no unconsumed oxygen leaving the unit. The sulphides of cadmium and lead are volatilised from the upper part of the bed where the temperature is above 1,050°C and withdrawn with the flue gases.

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168 BRITISH PATENT 809,765. "ROASTING ZINC SULPHIDE ORES"

NEW JERSEY ZINC CO.

Method of separating lead and other sulphide components from finely-divided zinc sulphide or concentrates. The finely-divided ore concentrate is agglomerated into discreet particles ranging from 4 to 65 mesh (Tyler standard), and charged into the upper portion of a columnar fluid bed maintained in fluidized condition by the upward flow of gas. Sulphide-roasting air is introduced into the lower portion of the bed at least 5% in excess of that required for the zinc sulphide component of the charge and above this but still below the upper surface of the bed, fuel gas at least sufficient to consume the excess sulphide-roasting air is introduced, thus providing an atmosphere in the upper portion of the bed which is non-oxidising to the sulphides. The fluid bed is maintained at a temperature of at least 900°C while discharging from its lower end roasted zinciferous particles and having withdrawn from its upper end gases containing the sulphides volatilised from the ore charge. (See above No. 167.)

SOLDERING

169 BRITISH PATENT 798,454. "SOLDERING PRINTED CIRCUITS"

ULTRA ELECTRIC LTD.

Method of and apparatus for soldering printed circuits. The board, with the conductors facing downwards, is moved across an elongated jet of solder.

170 BRITISH PATENT 798,701. "SOLDERING COMPONENTS TO PRINTED CIRCUITS"

FRY'S METAL FOUNDRIES LTD.

Passing the undersurface of the circuit panel over a wave of molten solder. (This appears to cover the Flowsolder process.)

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171 BRITISH PATENT 801,510. "SOLDERING MACHINE"

SYLVANIA ELECTRIC PRODUCTS INC.

Description of machine and method. A flow of molten solder issues from a discharge port and the work is passed over the solder.

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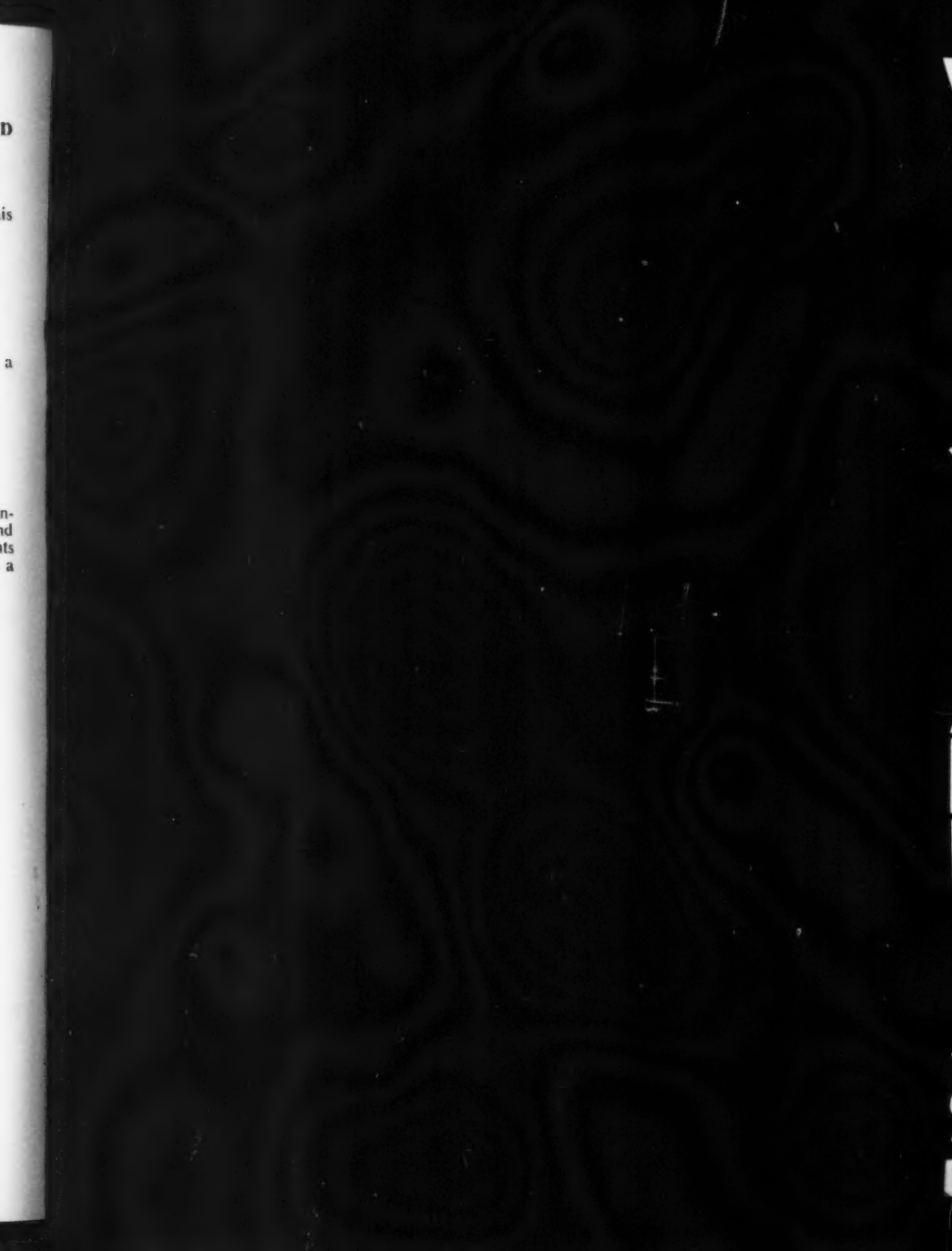
172 BRITISH PATENT 809,724. "PRINTED-CIRCUIT SOLDER-COATING"

STANDARD TELEPHONES & CABLES LTD.

A sheet of insulating material, carrying on one or both surfaces an electric conductor, is immersed in a bath of molten solder, withdrawn from the bath and wiped with a resilient device to remove surplus solder. Additional treatments include immersion in a liquid fluxing bath prior to soldering and immersion in a bath containing a solvent for the fluxing agent after the soldering treatment.



Charles Kiphick Ltd., Printers, Biggleswade.